KING COUNTY CONVEYANCE SYSTEM IMPROVEMENT PROJECT

TASK 110 - DOCUMENT TRACKING DATABASE AND INFORMATION MANAGEMENT SYSTEM

MARCH 2000

INTRODUCTION

During the course of the Conveyance System Improvements (CSI) Project, many documents have been gathered and reviewed in an effort to summarize the present and historical wastewater conveyance issues in King County. The large number of documents reviewed and the availability of information management technology has provided an ideal opportunity to construct a comprehensive database of documents relating to the King County conveyance system. This memorandum contains a basic introduction to the CSI database including a description of the data model, database design, and intended usage.

DATA MODEL AND DATABASE DESIGN

The CSI database was constructed using Microsoft Access 97. The documents populating the database include King County planning reports, environmental impact statements, operations and maintenance manuals, consultant prepared technical reports and memoranda, facility predesign and design documents, etc. Full text copies of the documents do not reside within the database[1]. Instead, information describing the documents and the information contained in the documents is recorded in a number of data fields. The document title, date of preparation, author, associated facilities, local wastewater agencies, and service basins are among the various types of information collected from each document (see Tables 1 through 4 for full list of fields).

The data are stored in either the *Documents Table*, or one of three linked tables: *Document-Facility*, *Document-Agency* and *Document-Basin*. The *Document Table* is used for data types that have a one-to-one relationship with each document. For example, there is a one-to-one relationship between *Date Prepared* and a document, because each document only has one preparation date. By contrast, there is a one-to-many relationship between documents and facilities, because several facilities could be associated with a particular document. Separating associated facilities, agencies and basins into linked tables uses less space and speeds up database performance.

[1] The documents researched for the CSI project span several decades; electronic copies of many of the documents do not exist.

Table 1. Document Table Data Fields

Data Field Name	Type	Description
Document Title	Text	Document title
KC Library ID	Text	Call number (for future use)
Document Location	Text	Where the document is stored (more important during CSI project)
Date Prepared	Date	Publication date (mm/yyyy)
Prepared For	Text	For what agency was the document prepared
Prepared By	Text	What agency/firm prepared the document
Principal Author	Text	Principal author
Document Type	Text	Drop-down list of document types
Population Data	Yes/No	Does the document contain population data?
Flow Data	Yes/No	Does the document contain flow data?
Permitting Information	Yes/No	Does the document contain permitting information?
Design Drawings/Specs	Yes/No	Does the document contain drawings or specs?
Digital Information	Yes/No	Does the document come with digital/electronic information?
Summary	Memo	A summary of key features that would be suitable for text searching. Each record in a memo field type can store up to 64,000 characters.
OLE Link	OLE Object	Link to related file on KC network (optional)

Table 2. Document-Facility Table Data Fields

Data Field Name	Type	Description
Facility Name	Text	King County or local agency conveyance facility
Entered By	Text	Group doing data entry (KC or name of consultant)
Revision Date	Date	Date information entered (for error checking)

Table 3. Agency-Facility Table Data Fields

Data Field Name	Type	Description
Agency Name	Text	Local wastewater management agency name
Entered By	Text	Group doing data entry (KC or name of consultant)
Revision Date	Date	Date information entered (for error checking)

Table 4. Basin-Facility Table Data Fields

Data Field Name	Type	Description
Basin Name	Text	Wastewater service basin name
Entered By	Text	Group doing data entry (KC or name of consultant)
Revision Date	Date	Date information entered (for error checking)

During the CSI project, electronic copies of the database have been distributed to King County and members of the consultant team for data entry. Periodically, all copies of the database have been retrieved via the CSI project web site and synchronized. After completion of the CSI project, the master CSI database will be transferred to King County. King County will maintain the database and be responsible for entering additional documents.

DATABASE USAGE

This section contains an overview of the basic data entry and document query features of the CSI database. Figure 1 shows the database startup screen, which is automatically launched when the database is opened. From the startup screen, the user may choose to enter a new document, provide additional information about a previously entered document, query the existing documents based on a wide set of possible parameters, or exit the program.

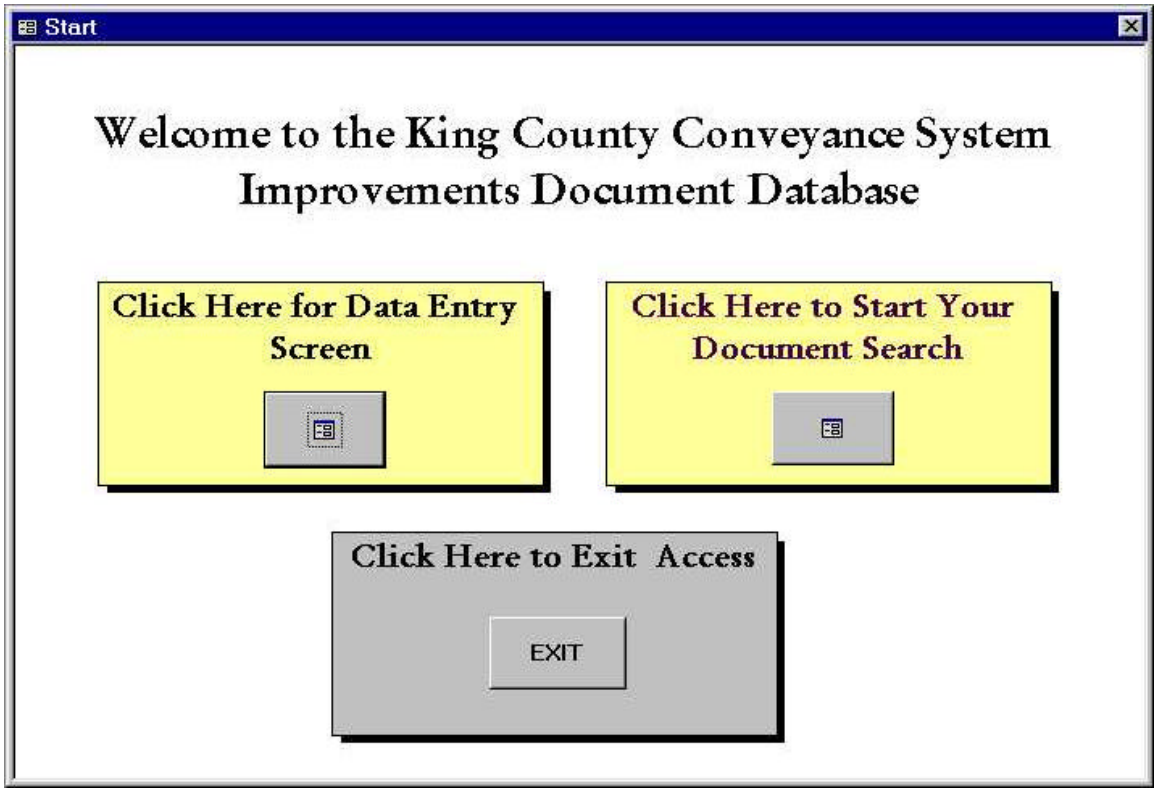


Figure 1. Database Startup Screen.

Data Entry

After selecting the data entry button from the startup screen, the data entry form (Figure 2) is opened. The form initially has an empty document title field, so that a new document can be entered. If more information is to be entered for an existing document, the record navigation buttons will allow the user to scroll through the list of documents until the desired document is found.

One other point of note is the *Doc Type* box. This control has been designed using a *combo box* that will only allow the user to choose among a pre-established set of document types. Combo boxes help preserve data integrity by limiting the number of different document types to a prearranged list, eliminating spelling errors and multiple names for the same type of document. These controls are particularly useful when data entry responsibilities are shared among several people.

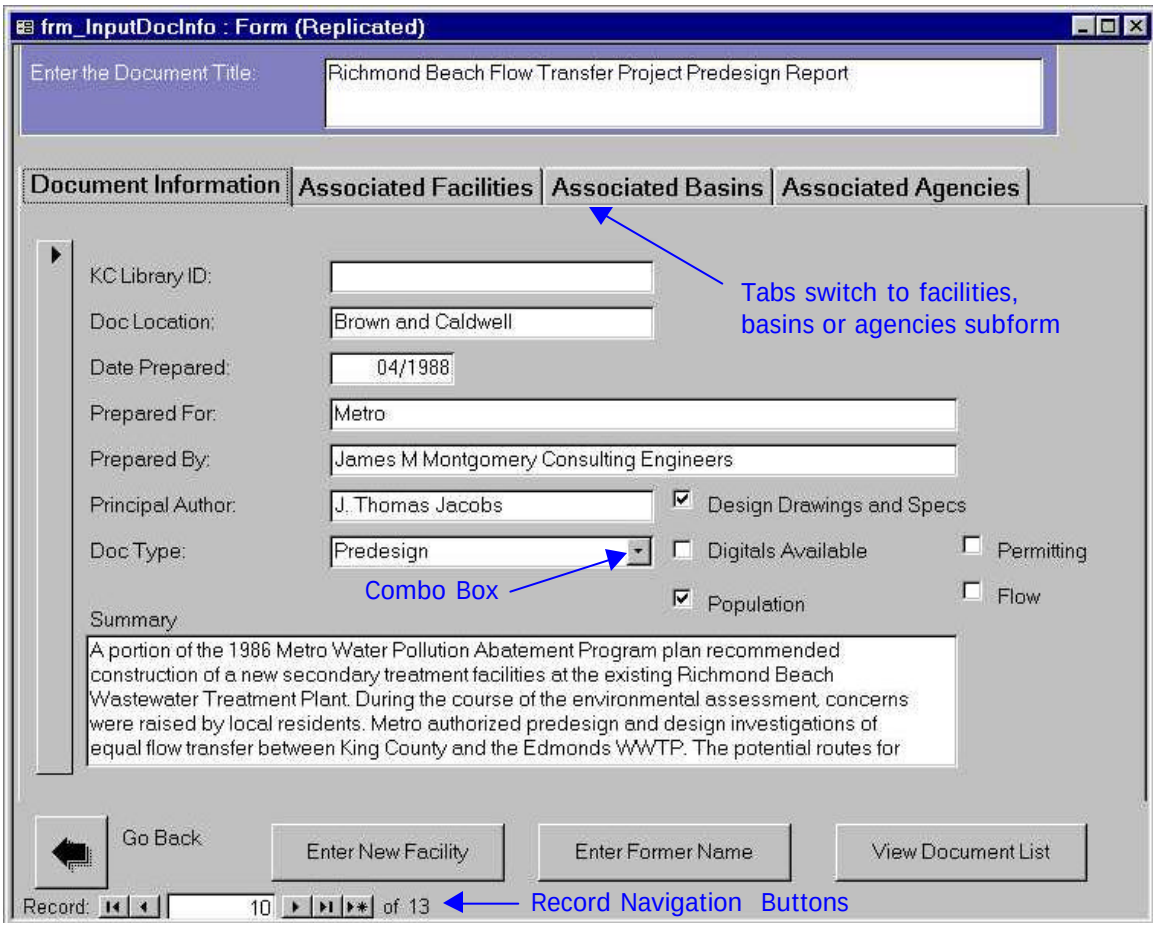


Figure 2. Main Data Entry Form.

After entering the basic information shown in Figure 2, the user may then choose a facility, sewer agency, or basin to associate with the document (Figure 3). Similar to the *Doc Type* field, the facility, agency and basin forms make use of *combo boxes* to preserve data integrity. When the *Facility Name* combo box is selected, a drop down list appears with the names of all facilities contained in the *Facilities Table* (Table 5). A comprehensive list of King County off-site facilities[2] was added to this table before the database was distributed for document entry. The *Facilities Table* should currently include all existing, major King County off-site facilities. However, it was not feasible to include all local agency facilities prior to distributing the database. Therefore, the database includes a simple method for adding facilities. Selecting the *Enter New Facility* button will launch a form where the necessary information can be entered.

[2] The comprehensive list of facilities were drawn from the *King County Offsite Facilities and Miscellaneous Structures Manual*, the King County "one-line" diagrams of trunk, interceptor and force main sewers, and knowledge of current projects.

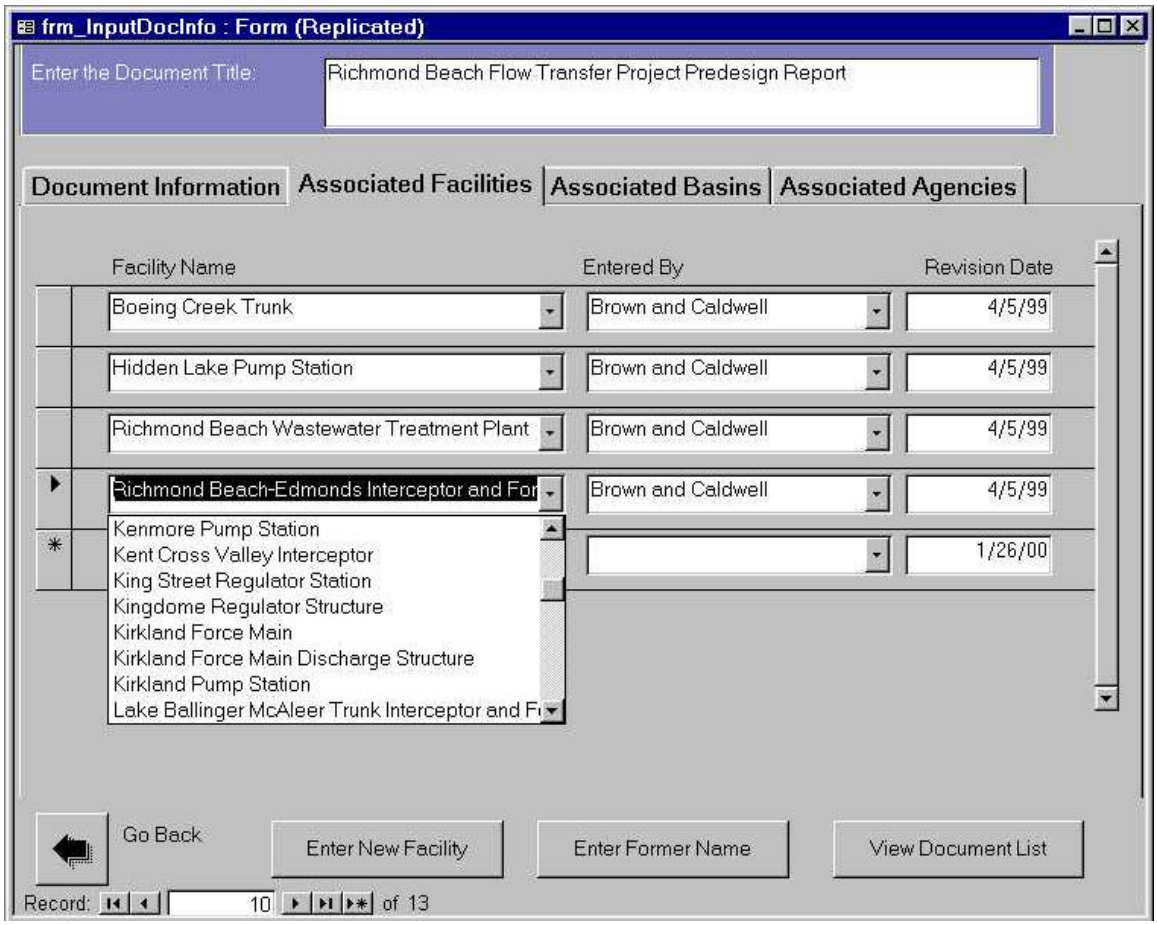


Figure 3. Facilities Data Entry Subform.

Similar to the *Facilities Table*, the *Agencies Table* (Table 6) and *Basins Table* (Table 7) contain a precompiled list of agencies and basins that was supplied by the King County GIS group. The list of agencies and basins should be complete and relatively static, so there should rarely be a need to add new agencies or basins to the database. However, if agency or basin information must be changed, the user should contact the database administrator.

Throughout the development of the regional wastewater conveyance system, some of the agencies and basins contained in the database have been known by different names. For example, the Shoreline Wastewater Management District was previously known as the Ronald Sewer District. To avoid potential inconsistencies that name changes present, an agency or basin's former name has been linked to its current name in the CSI database. Selecting the *Enter Former Name* button launches a form that allows the user to associate an agency or basin with its previous name. Database queries will consider current and former names equivalent, so a search for documents relating to the Shoreline Wastewater Management District will also return documents relating to the Ronald Sewer District.

Table 5. Facilities Table Data Fields

Data Field Name	Type	Description
Facility Name	Text	King County or local agency conveyance facility
Facility ID	Text	King County or local agency facility ID
CSI Project	Text	CSI project associated with facility (if any)
Map	OLE Object	Electronic map of facility
Owner	Text	Owner of facility
Operation	Text	In service, former service, or future service

Table 6. Agencies Table Data Fields

Data Field Name	Type	Description
Agency Name	Text	Local wastewater management agency name
Street Address	Text	Street address
City	Text	City
State	Text	State
Zip	Text	Zip
Phone	Text	Phone
Contact Name	Text	Agency contact
Contact E-mail	Text	Contact e-mail address
AKA	Text	Former name of agency (if any)

Table 7. Basins Table Data Fields

Data Field Name	Type	Description
Basin Name	Text	Wastewater service basin name
AKA	Text	Former name of basin (if any)
Mega Basin	Text	Mega Basin containing service basin

Queries and Reports

The query engine has been designed to accept a broad set of parameters, so that the user can search for documents using virtually any combination of the fields contained in the database. Figure 4 shows the results of a query on all documents associated with the Juanita Bay Pump Station, prepared between January, 1985 and January, 2000. The user selects parameters in the upper portion of the form and the query results are shown in the bottom portion of the form[3].

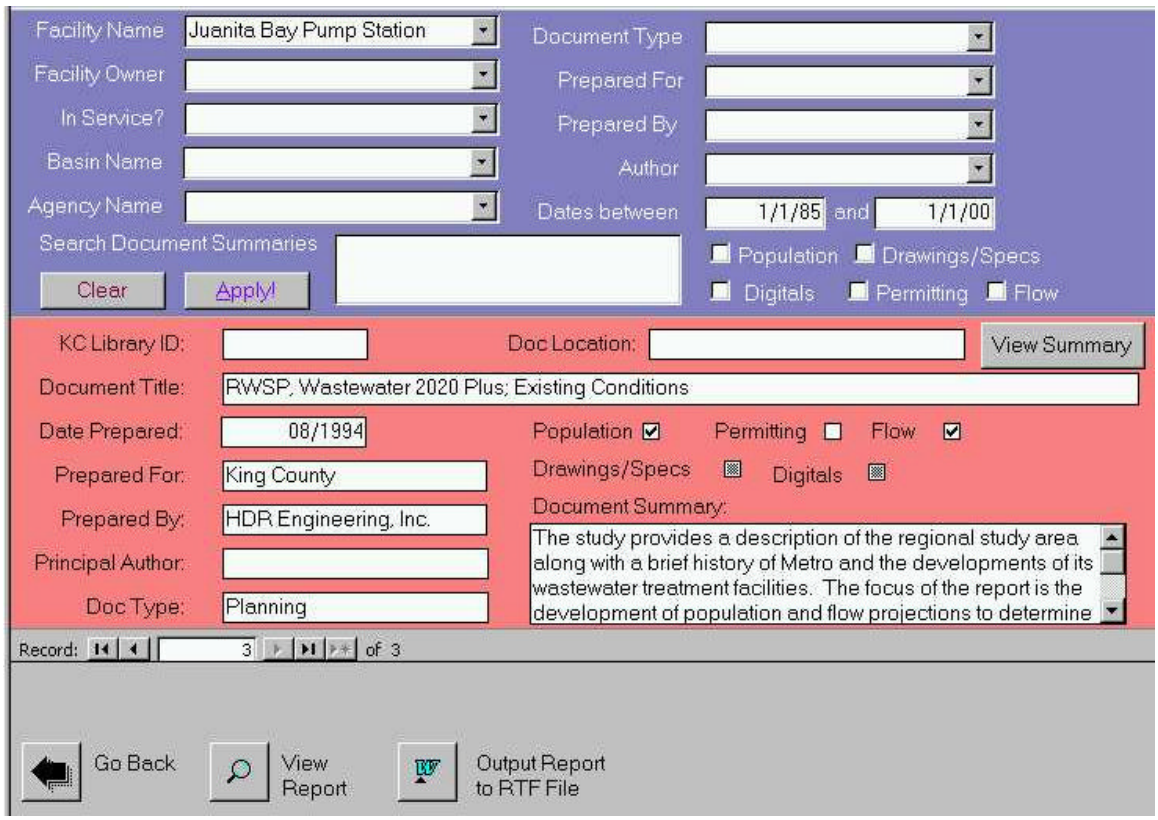


Figure 4. Sample Query Using Facility Name and Preparation Date.

The record navigation bar shows that the database contains three documents meeting the query parameters given. Using the record navigation buttons, the user can scroll through the information on each of the documents returned by the query. To prevent accidental changes to the data, the information in the text boxes in the results section of the query form cannot be edited. However, if an error is noted, the user should contact the database administrator.

[3] When multiple parameters are chosen, they are combined using a logical AND. In Figure 4, the selected parameters combined to form the following query: (FacilityName = "Juanita Bay Pump Station") AND (DatePrepared >= 1/1985 AND DatePrepared <= 1/2000)

Figure 5 shows an example of a keyword search. The database is queried for all documents that contain "Shoreline" in the summary field, *and* also have population data.

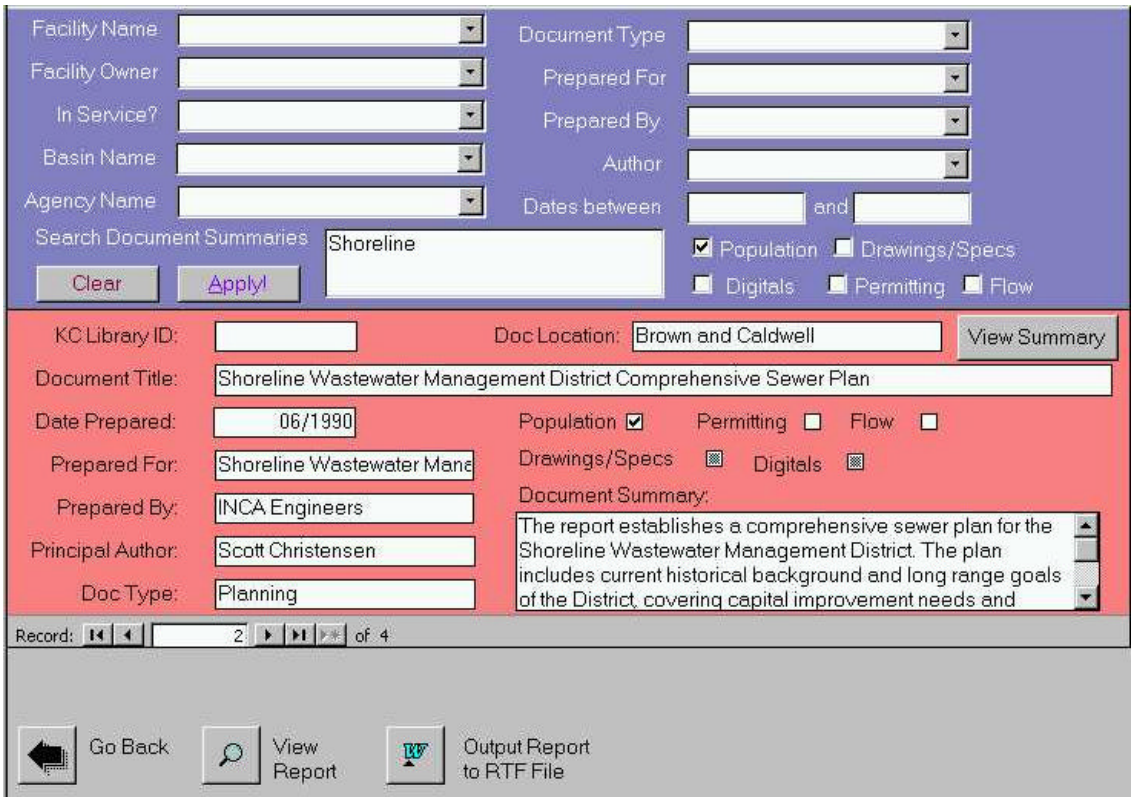
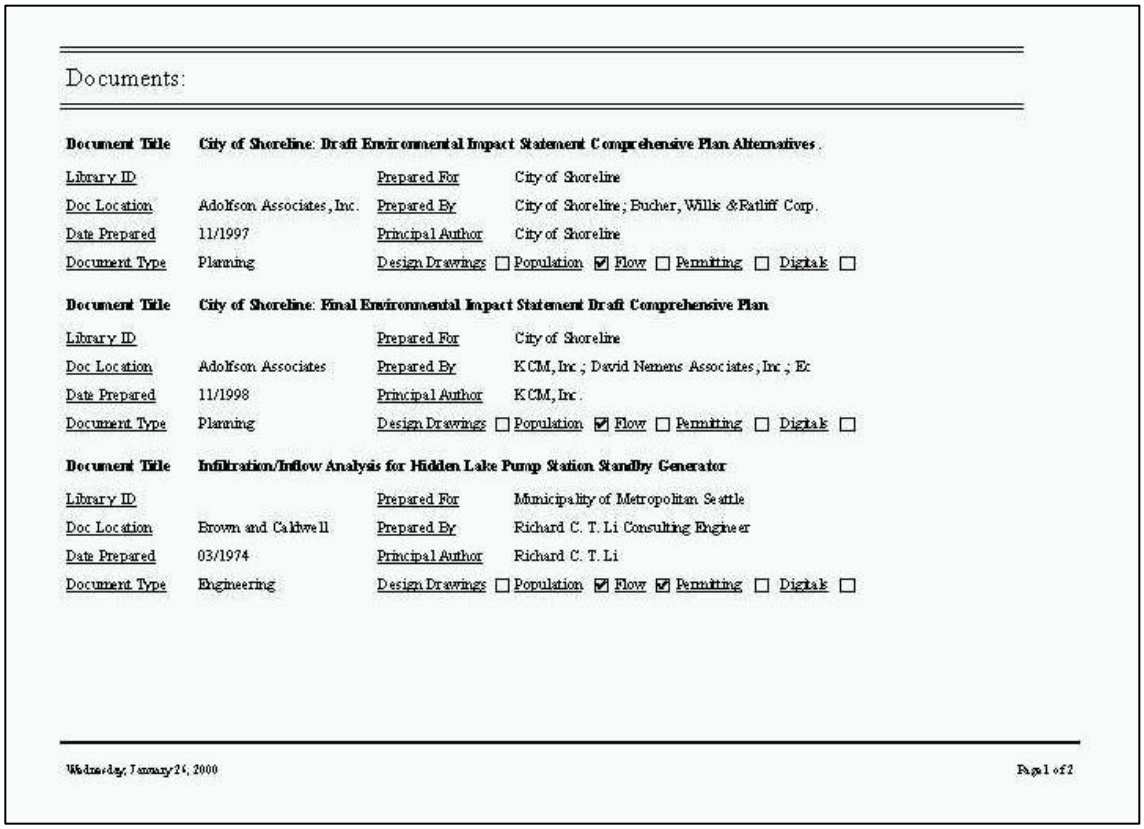


Figure 5. Sample Query Using a Key Word Search String and a Toggle Box

The results section of the query form displays a lot of information, but only one document at a time can be displayed. To better view all documents corresponding to a specific query, the database enables the user to generate clearly formatted reports. Results can be viewed "print preview" style for easy printing (Figure 6), or output to a rich-text-format file, viewable with Microsoft Word and other common world processing programs.



Documents:

Document Title	**City of Shoreline: Draft Environmental Impact Statement Comprehensive Plan Alternatives.**		
Library ID		Prepared For	City of Shoreline
Doc Location	Adolfson Associates, Inc.	Prepared By	City of Shoreline; Bucher, Willis & Ratliff Corp.
Date Prepared	11/1997	Principal Author	City of Shoreline
Document Type	Planning	Design Drawings ☐ Population ☑ Flow ☐ Permitting ☐ Digital ☐	
Document Title	**City of Shoreline: Final Environmental Impact Statement Draft Comprehensive Plan**		
Library ID		Prepared For	City of Shoreline
Doc Location	Adolfson Associates	Prepared By	KCM, Inc.; David Nemens Associates, Inc.; Ec
Date Prepared	11/1998	Principal Author	KCM, Inc.
Document Type	Planning	Design Drawings ☐ Population ☑ Flow ☐ Permitting ☐ Digital ☐	
Document Title	**Infiltration/Inflow Analysis for Hidden Lake Pump Station Standby Generator**		
Library ID		Prepared For	Municipality of Metropolitan Seattle
Doc Location	Brown and Caldwell	Prepared By	Richard C. T. Li Consulting Engineer
Date Prepared	03/1974	Principal Author	Richard C. T. Li
Document Type	Engineering	Design Drawings ☐ Population ☑ Flow ☑ Permitting ☐ Digital ☐	

Wednesday, January 26, 2000 Page 1 of 2

Figure 6. Sample Report (page 1 of 2 shown)

SUMMARY

The CSI database should become a valuable resource for future King County projects. As a central storehouse for documents relating to wastewater projects, the database can aid King County staff by streamlining the process of gathering background information about specific facilities, sewer agencies and wastewater service basins.

At present, the design and development of the CSI database has been completed. Documents are being added to the database by the project consultant team, which is conducting background research on CSI basins, and by King County personnel, who are cataloguing existing King County reports. Currently, approximately 100 documents have been entered into the database, and this number is expected to increase considerably by the end of the CSI project.

At the completion of the CSI project, the database will been turned over to King County for administration and maintenance. The CSI database should continue to grow (and retain its relevance) as documents produced for future wastewater projects are catalogued in the database.